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AUTHOR Bireley, Marlene
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ABSTRACT

This paper presents a review of the major ideas on the nature of intelligence and giftedness. Especially noted are theories of Howard Gardner, Robert Sternberg, and J.P. Das. Gardner expanded traditional notions of intelligence to include such talents as spatial ability, musical intelligence, bodily-kinesthetic intelligence, and interpersonal and intrapersonal intelligences. Sternberg identified seven metaphors for the mind and intelligence (geographic, computational, biological, epistemological, anthropological, sociological, and systems) and proposed a triarchic theory of intelligence consisting of three elements: metacomponents, performance components, and knowledge acquisition components. Subtheories specify the internal mental mechanisms that lead to intelligent behavior, the role of experience, and adaptation to the external world. The work of Das follows the ideas of the Russian psychologist, A.F. Luria. It sees the brain as involving an arousal system, a sensory reception and integration system, and a system for programming, regulation and verification of activity. A model of information integration replacing the conventional model of intelligence has been developed based upon planning, attention, simultaneous and successive processes. Also noted are ideas of Joseph Renzulli and others and the political implications of these ideas for gifted education in Ohio. (21 references) (DB)

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Conceptions of Intelligence and Giftedness

Marlene Bireley — *Professor Emeritus, Wright State University*

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Conceptions of Intelligence

Among psychologists, Edwin Boring is best remembered for two accomplishments. One of these accomplishments is a detailed history of the persons and ideas that shaped the field of psychology (Boring, 1950). The other is a simple, thought-provoking statement: "Intelligence as a measurable capacity must at the start be defined as the capacity to do well in an intelligence test. Intelligence is what the tests test" (Boring, 1923, p. 35).

The first accomplishment is a useful review, but the latter is disturbingly prophetic. Despite the addition of many new theories, technological advances, and heightened concern about the untapped gifted among our various atypical populations, we are still bound to the concept that intelligence emanates from a child's functioning on a selected set of items, under a set condition, administered in a very short amount of time. Such information has been useful in the establishment of basic programs, but it is time to move on and consider a broader concept of both intelligence and giftedness.

Boring (1950) traced the measurement of human capacity from its inception in the mid-1800s to the middle of the 20th Century. Recently, Robert Sternberg (1990), one of the most prolific and influential of the current theorists in this field, reviewed the history of "intelligence" and presented a framework for viewing past and present conceptions of this illusive concept. While it is impossible to do justice to the work of either man in a limited space, a brief review may set the stage for consideration of definitions of both *intelligence* and *giftedness*. In the final analysis, highly personal variations may exist for both concepts, and these may be subject to change within the reality of various political contexts.

Concern with the nature of intelligence and intelligence testing comes from various sources. Galton, following the work of his cousin, Darwin, produced *Hereditary Genius* in 1869, starting the movement that advocated the primacy of "nature" in the development of the highly intelligent. At the same time, the German, William Wundt, was developing a series of psychophysiological tests concerned primarily with the speed of reaction time during various sensory-motor tasks. While Cattell was naming these tasks "mental tests" and promoting them in the United States, the Frenchmen, Binet and Simon, were conceptualizing a set of tasks aimed at identifying the mentally retarded. The initial Binet-Simon product, published in 1905, extended the required tasks to include "memory, imagery, imagination, attention, comprehension, suggestibility, aesthetic appreciation, moral sentiments, strength of will and motor skill" (Boring, 1950, p. 572).

In the United States, Lewis Terman translated and adapted the Binet-Simon test and popularized the concepts of mental age and intelligence quotient (a ratio comparison of chronological and mental age). The Stanford-Binet became the norm for individual assessment, later to be joined by the scales of David Wechsler who abandoned the concept of mental age but added verbal and performance sub-scores to the single overall intelligence quotient (IQ). On another front, advances in statistical analysis led to interest in factorial analysis and the "normal curve," to name just two continuing influences on the identification and labelling of exceptional groups (Boring, 1950).

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Other significant movements provided their own influence in shaping current understanding and use of the terms *intelligence* and *giftedness*. During World War I, the first wide-scaled use of a group test, the Army Alpha, was devised to place inductees in appropriate positions in the military. The inability of many illiterate soldiers to respond to this verbal, written test led to the development of the nonverbal test, the Army Beta, and fueled the continuing nature-nurture controversy (Anastasi, 1982). The use of group tests continues as does some concern about their appropriateness. While individual tests are used exclusively in the identification of disabled children, group intelligence tests, such as the Cognitive Abilities Test (Thorndike & Hagen, 1986), have been more typically used to identify gifted children. This practice can be supported for gifted children who are good test takers and good readers but may seriously under-identify the atypical gifted because of their lack of test sophistication, inability to attend well in a large-group administration, and/or the presence of reading difficulty.

According to Sternberg (1990), the cited historic influences have been joined by others, most notably the information-processing model. Sternberg developed a framework of seven metaphors for the mind and its function, intelligence, which summarize the viewpoints of those who have contributed to this process over the last century and a half:

1. The *geographic* metaphor perceives the mind as a map and encompasses two-factor and multiple-factor theories, such as those of Spearman, Thurstone, and Guilford.
2. The *computational* metaphor seeks the information-processing routines that underlie intelligent thought and are best represented by Sternberg himself.
3. The *biological* metaphor searches for anatomical/physiological correlates to intelligence and delves into such issues as hemispheric localization, as theorized by Luria and Das.
4. The *epistemological* metaphor is concerned with the structures of the mind through which knowledge and mental processes are organized, as postulated by Piaget and his followers.
5. The *anthropological* metaphor proponents perceive intelligence as a cultural invention, as held by Berry, Cole, and Charlesworth.
6. The *sociological* metaphor proposes mediated learning experiences and the internalization of social processes as the basis for intelligence, as theorized by Vygotsky and Feuerstein.
7. The *systems* metaphor perceives the mind as a system that crosscuts and incorporates many of the other metaphors, as did Gardner in his concept of multiple intelligences and Sternberg in his triarchic theory of intelligence.

Three of these theorists and their colleagues are very active in areas of research that are likely to expand conceptions of giftedness and intelligence. These three are Howard Gardner, Robert Sternberg, and J.P. Das (the latter working with Jack Naglieri).

Howard Gardner (1983), while less defined than the other two theorists, served to expand our consciousness beyond the academically oriented gifts that he labelled linguistic and logical-mathematical intelligences. To these he added the intelligences (or talents) of spatial ability (such as those used by the pilot, the architect, and the chess player); musical intelligence,

which allows people to sing, play, and appreciate music; bodily-kinesthetic intelligence, which involves using the various body components, in such diverse activities as athletics or surgery; and interpersonal and intrapersonal intelligences, which involve knowing others and ourselves and can form the basis for both human service careers and for personal understanding and satisfaction. For gifted educators, acknowledgement of the additional five intelligences raises questions of both identification and curricular content.

Sternberg's triarchic theory of intelligence consists of three elements: metacomponents, performance components, and knowledge acquisition components. In reverse order, knowledge acquisition pertains not only to the learning of basic information but also to the selection of the appropriate information for the given task. Performance components include those many processes that execute the instructions of the metacomponents and that, depending on the task, may entail higher-order thinking skills or rather low-level performance. Finally, metacomponents are those higher-order processes that entail planning, monitoring, and evaluating.

In adapting this theory of giftedness, Sternberg added three sub-theories and defined exceptional intelligence as "purposive adaptation to, shaping of, and selection of real-world environments to one's life" (Sternberg, 1986, p. 235). The first sub-theory specifies the internal mental mechanisms that lead to intelligent behavior; the second specifies the role of experience, including reaction to novel situations and automatization of repetitive situations (ability to generalize); and the last involves adaptation to the external world, which may vary across cultures and even subcultures (Sternberg, 1986). The latter point may imply that integration of economically or ethnically different children into gifted programs must include an understanding and accommodation of these differences if such children are to succeed. Part of the attraction of Sternberg's theory is his attempt to translate it into practical application. For that purpose, Sternberg (in press) has devised a *Triarchic Abilities Test* and has co-edited a book on teaching thinking skills (Baron & Sternberg, 1987).

The third line of research that merits attention is based on the Russian psychologist, A. F. Luria, and is being carried on by J.P. Das, Jack Naglieri, and their associates. The Luria model is meant more as a neuropsychological view of brain function rather than a theory of intelligence, but given the current interest in serving the disabled gifted population, both the theory and applications of the theory deserve consideration. Das (Das, Kirby, & Jarman, 1979) believed that a multifactorial view of intelligence could be implied from the model in that some tasks might entail specific systems, but high intelligence would result from the smooth integration of the three systems.

Luria described the brain as three systems that perform various levels of functioning and cut across several anatomical features:

- The *arousal system* interconnects cells in the subcortical brain, the reticular activating system, and the frontal cortex. Abnormalities in this system can lead to hyperactivity, hypoactivity, or sleep disorders.
- The *sensory reception and integration system* is contained in the cerebral cortex and consists of the reception and analysis of input from the five senses and the integration of this information across sense and across hemispheres of the brain.

- The third system, *programming, regulation, and verification of activity,* provides motoric response to the input and controls the decision-making functions of the brain. It resides primarily in the prefrontal and frontal lobes of the brain and is the last to mature.

Building on the Luria model, Das, Kirby, and Jarman (1979) proposed a model of information integration based upon simultaneous and successive processes. Simultaneous processes involve the synthesis of separate elements into groups (such as seeing a face instead of a collection of separate anatomical parts), and successive processes involve the processing of material in sequential order (as is required in spelling or mathematics). Breakdown in one or the other of these processes may result in a learning disability.

From this model, Das and Naglieri (Das & Naglieri, 1987; Naglieri & Das, 1988, 1990; Naglieri, Das, Stevens, & Ledbetter, 1991) developed a series of tasks designed to measure cognitive processes across the three functional systems. This so-called PASS model (planning, attention, simultaneous, and successive) replaces the concept of IQ with the concept of cognitive processing; replaces the model of intelligence based on content, modality, or method of presentation with one that describes the cognitive processes required to solve the tasks; and uses psychometrically sound tasks that fit the model and are measures of the cognitive processes (Naglieri, Das, Stevens, & Ledbetter, 1991). This experimental assessment system is now being readied for publication and may afford a whole new way of looking at intellectual functioning.

High intelligence wears many faces. It can be viewed narrowly as good test-taking skills or, more appropriately, as a combined result of genetics, cultural heritage, and environmental opportunity, which leads to a superior ability to process information. Linking a given theory to a given gifted program is a mighty leap, but ignorance of the knowledge base that now exists in this field will most certainly diminish the effectiveness of existing programs and narrow the scope of their service. New assessment procedures, new emphasis on the skills of information processing (or thinking), and a better understanding of the atypically gifted can be developed from these models.

Conceptions of Giftedness

Sternberg addressed both intelligence and giftedness. Most authors discuss either one or the other. Those who conceptualize giftedness are more likely to have a direct interest in applications to the education of the gifted child. Foremost among those cited must be Joseph Renzulli and his three-ring conception of giftedness. The three rings include the following:

- *Above average general or specific ability* (or talent)
- *Task commitment,* or the ability to bring energy, "perseverance, endurance, hard work, dedicated practice, self-confidence, and a belief in one's ability to carry out important work" (Renzulli, 1986, p. 69)
- *Creativity,* or originality, freshness of thinking, and the ability to attack novel situations by setting aside conventions and standard procedures

Given the limitations of current assessment instruments to detect these characteristics, Renzulli advocated serving a larger group than the traditional 3% to 5% within a "Revolving Door Model." He further distinguished between "school-house" (or test taking, lesson learning) giftedness and creative-productive giftedness that may more likely be manifested in

those areas of study that have personal meaning to the student. Renzulli supported the relevance of each and the need to support the development of both.

Horowitz and O'Brien (1985) developed a developmental model of giftedness that explores the interaction of environmental and organismic variables (that old nature-nurture issue). It was their contention that the former falls on a facilitative/nonfacilitative continuum and that the latter falls on a similar vulnerable/invulnerable continuum. Organisms (or persons) that are least vulnerable and are given the most facilitative environment become our most gifted. They cited the role of both the home and the school in providing these facilitative environments.

A good example of a facilitative environment is that created by Barbara Clark (1986) who, believing that creativity is the highest form of giftedness, developed an integrative education model that combines thinking with feeling, the senses, and intuition. They advocated such activities as stress reduction and movement education as well as challenging cognitive activity, where student choice and empowerment are made possible within a responsive environment. While more of a curricular model than a conception of giftedness, integrative education is designed to develop the full potential of each child.

Finally, a delineation of the six subtypes of gifted provided by Betts and Neihart (1988) has helped to shape thinking about those who are gifted and about what needs to be done to identify and serve them appropriately:

1. The *successful gifted* who conform and achieve, but who may be too perfectionistic and lack in risk-taking behavior
2. The *challenging gifted* who are creative, bored, and rebellious and may need assistance in becoming self-controlled and committed to the group
3. The *underground gifted* whose shyness and poor self-concept may keep them from surfacing as part of the gifted population
4. The *gifted dropouts* who may be angry, explosive, and burned out in the school situation
5. The *double-labelled* who are both disabled and gifted, but who may be overlooked except for their handicap
6. The *autonomous gifted* who are enthusiastic achievers, have a good sense of self, are intrinsically motivated, and psychologically healthy

The joy of gifted education is in producing large numbers of autonomous gifted. The challenge is in producing them by effecting change in the other five categories.

Political Implications and Future Directions

Gifted education in Ohio and throughout this country is now at a crossroads. Ohio has developed standards based on the Marland (1972) categories of general intellectual ability, specific academic ability, creative or productive thinking, and talent in the visual or performing arts, and has developed programs of various quality and quantity to serve these categories. Educators of the gifted have access to a considerable knowledge base about gifted children, have written curricula, and have acquired techniques to counsel children and their parents about the joys and pitfalls of being gifted. They have watched the reactions of children who have been introduced to the satisfaction of engaging in higher-level thinking, completing personally selected long-term projects, and mastering creative problem solving.

On the negative side, while educators of the gifted have supported the concept of enlarging the gifted "pool" to include the disabled, the culturally and ethnically different, and the economically disadvantaged, they have not adjusted identification procedures, overreliance on group test scores, and notions about intelligence and giftedness to allow this to happen. They have looked at the continuum of services model borrowed from special education and adapted for the gifted by the Pyramid Project (Cox, Daniel, & Boston, 1985) but have applied it with half-hearted enthusiasm and supported it with little or no funding. They have talked of the need to become a model for educational reform, but have continued to isolate themselves from their general education colleagues.

Phase one of education of the gifted in Ohio is now complete. Educators entered this process with limited resources and a limited knowledge base but with a real commitment to and enthusiasm for bettering the education of Ohio's most able children. They need to look at their successes and adjust their standards, programs, and thinking so that they can move on to a broader-based, more successful second phase.

The enthusiasm of those involved in gifted education and the needs of the children remain constant. Signs of change are everywhere. If educators build on what they have learned from their experience and meld it with the ideas of those who have built a research base, they can more nearly address the needs of those many students who will both demand and deserve an exceptional education in the 21st Century.

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